AEC 2019

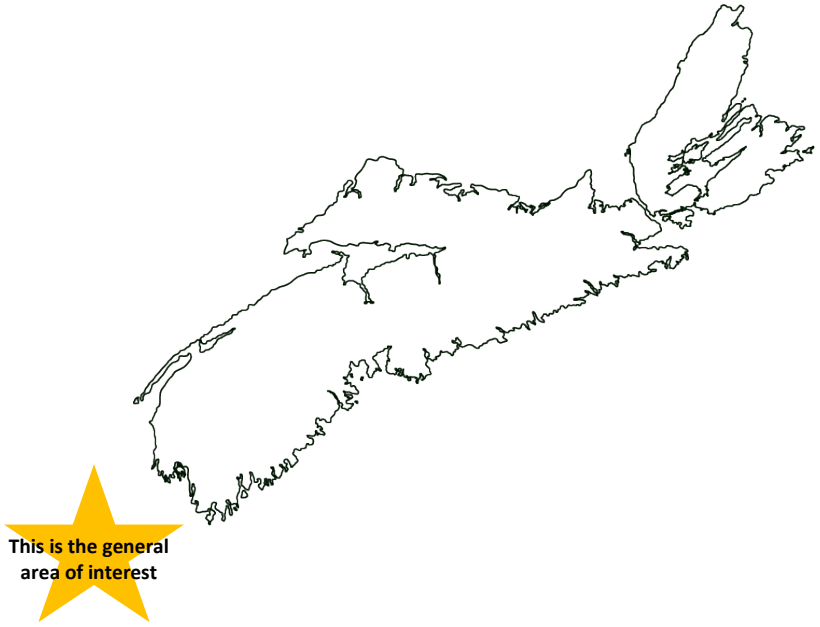
PROGRAMMING COMPETITION CASE

BACKGROUND

As the need for clean and renewable energy increases, alternatives to oil and gas are being explored. One of these technologies is offshore wind energy, which places existing wind power technology in bodies of water. Currently, wind farms create 19% of Nova Scotia's electricity, however offshore wind offers many advantages to traditional wind farms, including increased and steadier wind speeds and decreased noise pollution to neighbouring communities.

THE CASE

The client is looking to scope the potential of offshore wind in Nova Scotia near the Yarmouth area. They have collected information regarding windspeeds, building costs, and sea floor depth, and are willing to share it with you. With this information, the client wishes to have some software that will allow them to predict the viability of an offshore wind project. The specifics of the project are malleable, and details are changing very quickly. For this reason, the client wishes to keep this tool and use it repeatedly over the planning process. They hope this tool will give them a starting point to plan for a wind farm by detailing what is possible under a specific budget.



Input requirements

The software at minimum should accept some input from the user. There is no restriction on the amount of input measures if the team desires. These additions should be stated and explained.

Presently the client is only interested in planning for the potential in a specific region, and for that reason is only providing the data they have for this area.

Data requirements

The client will be providing you data in an Excel document for their project. *This document must be utilized in some way*. Teams are encouraged to incorporate other relevant resources or information they have collected, as long as it is justified*. It should be noted that as this is a dynamic project, the Client Data can be subject to additions, deletions, or other modification. Teams are not required to keep the Client Data in the original format, so long as the client is able to modify the data accordingly.

*However, for the purposes of this competition, actual wind data and ocean floor depth should not be considered. The data the client is providing you with is sufficient for these areas of interest.

Some relevant resources can be found through the following links:

Offshore Energy Research Association - Renewable Generation Supply Chain Opportunities in Atlantic Canada
http://portal.oera.ca/dataset/renewable-generation-supply-chain-opportunities-atlantic-canada/resource/f9fa0f8b-15ec-41dd

Offshore Energy Research Association – Data Portal
http://portal.oera.ca

Output Requirements

At minimum, the user should receive a summary of a single viable (optimality is not required) wind farm plan for the client. This could include but is not limited to placement of turbines, number of turbines, type of turbine, or time spent under construction. There are no expectations for specifics of the
output summary, as long as it is clear and documented.

Additional Considerations

Teams should be aware of other potential uses/features the client may desire. Some of these are listed below:

- The user may want to understand the potential of power generation for the solution given.
- The user may want to receive several viable plans under a single budget constraint.
- The user may want to constrain certain expenditures and not others.
- The user may desire a way to save the output for later review.
- The user may not be familiar with software and would like to easily understand the interface.

It should be clear what teams intend to have judged.

LOGISTICS

All teams will have eight hours to complete the task. Each team will be given a private version control repository from the Competition Director containing all rules, evaluation scheme, and Client Data. This version control is expected to contain all competition materials and should be updated at minimum once per hour. There are no restrictions on the programming language, IDE's, or additional libraries used, so long as everything used is documented in the version control.

REFERENCES

https://www.americangeosciences.org/critical-issues/faq/what-are-advantages-and-disadvantages-offshore-wind-farms

https://www.boem.gov/Renewable-Energy-Program/Renewable-Energy-Guide/Offshore-Wind-Energy.aspx

https://www.nspower.ca/en/home/about-us/how-we-make-electricity/renewable-electricity/wind-farm-map.aspx

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